Sagital Suture, croſs'd from one Parietal-Bone to the other, as far as the Coronal Suture on that ſide oppoſite to the Wound; another had gone croſs the Coronal Bone; and the third was on the Parietal Bone on the ſide of the Wound, pretty near the *Sutura Squamoſa*; but what is moſt ſingular, is that none of theſe Fiſſures did reach that, upon which the Trepan had been applyed. An *Empyema* was found in the *Thorax*, and a conſiderable Impoſthume in the Liver.

II. *Jo. Keill ex Æde Chriſti Oxonienſis, A. M. Epiſtola ad Clariſſimum Virum Edmundum Halleium Geometriæ Profeſſorem Savilianum, de Legibus Virium Centripetarum.*

HAUD oblitus es, uti arbitror, Vir Clariſſime, te cum nuper eſſes Oxonii, Theorema, quo Lex vis centripetæ, *Quantitatibus finitis* exhiberi poſſit, mecum communicaſſe: Quod Theorema tibi monſtravit Egregius Mathematicus D. Abrahamus De Moivre, Dixitque Dominum Iſaacum Newtonum, Theorema huic ſimile prius Inveniſſe. Cum autem ejus demonſtratio perfacilis ſit, Eam, itemque alia de eadem re cogitata, non poſſum tibi non impertire. Etſi minime dubitem, quin, ſi idem argumentum pertractare libuiſſet, tu acerrimo quo polles ingenij acumine, rem omnem penitus exhaurire potuiſſes.

THEO.

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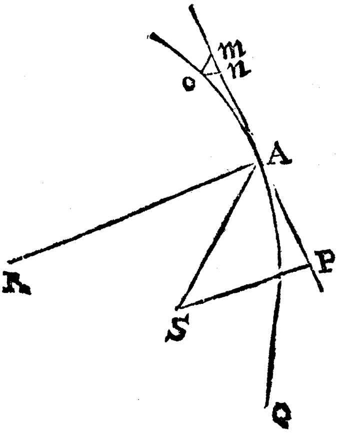
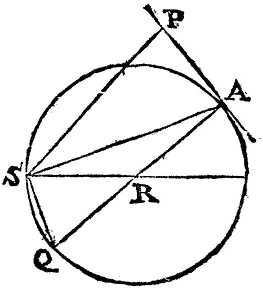
THEOREMA.

Si corpus Urgente vi Centripetâ in curva aliqua moveatur; Erit vis illa in quovis curvæ puncto, in ratione compoſita ex directâ ratione diſtintiæ corporis à centro virium, & reciprocâ ratione Cubi perpendicularis à Centro in rectam in eodem puncto Curvam Tangentem demiſſæ, ducti in Radium Curvaturæ quem ibi obtinet curva.



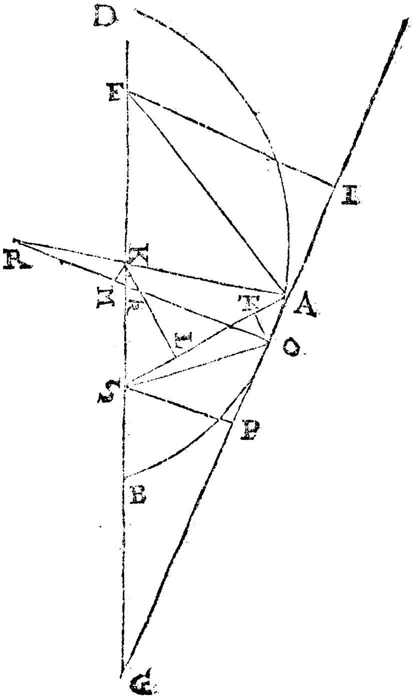
Sit Q A O Curva quælibet à mobili urgente vi centripeta ad punctum S tendente deſcripta. Sitque A O arcus in minimo quovis tempore percurſus, P *m* ejus tangens, A R Radius circuli æquicurvi, hoc eſt cujus Peripheriæ pars minima cum Arcu A O coincidat. Et ſit S P recta a puncto S in tangentem perpendiculariter demiſſa; Ducantur O *m* ad S A & O *n* ad S P Parallelæ. Et exponat O *m* vim qua mobile in A urgetur verſus S. Vis qua perpendiculariter à tangente recedit corpus, erit ut O *n*, id eſt vis tendens verſus R & faciens ut mobile, eadem qua prius velocitate latum, deſcribet circulum æquicurvum arcui A O erit ad vim tendentem verſus S, qua corpus in curva A O movetur, ut O *n* ad O *m*, vel ob æquiangula triangula ut S P ad S A. Sed corporum in circulis latorum vires centripetæ ſunt ut quadrata velocitatum applicata ad Radios; per Corol. Theorem. 4. Princip. Newtoni.

Eſt vero velocitas reciproce ut SP, ſive directe ut $\frac{1}{SP}$ adeoq;quadratum velocitat. erit ut $\frac{1}{SP^2}$: vis igitur ut O*n*, ſive vis qua in circulo æquicurvo moveri poteſt corpus, erit ut $\frac{1}{SP^2 \times AR}$: Oſtenſum autem eſt, eſſe SP ad SA ut vis tendens verſus R, qua corpus in circulo æquicurvo moveri poteſt, ad vim tendentem verſus S: ſed eſt vis tendens verſus R ut $\frac{1}{SP^2 \times AR}$, adeoque cum ſit SP : SA :: $\frac{1}{SP^2 \times AR}$: $\frac{SA}{SP^3 \times AR}$ erit vis tendens verſus S, ut $\frac{SA}{SP^3 \times AR}$. *Q. E. D.*



Cor Si curva QAO ſit circulus, erit vis centripeta tendens verſus S, ut $\frac{SA}{SP^3}$. Adeoque ſi vis centripeta tendat ad S punctum in circumferentia ſitum, erit [per 32 tertii] ang. PAS = ang. AQS; adeoque ob ſimilia triangula ASP, ASQ, erit AQ : AS :: AS : SP : unde $SP = \frac{AS^2}{AQ}$ & $SP^3 = \frac{AS^6}{AQ^3}$ unde $\frac{SA}{SP^3} = \frac{SA \times AQ^3}{AS^6} = \frac{AQ^3}{AS^5}$, hoc eſt, ob datum AQ, erit vis reciproce ut AS^5.

Sit



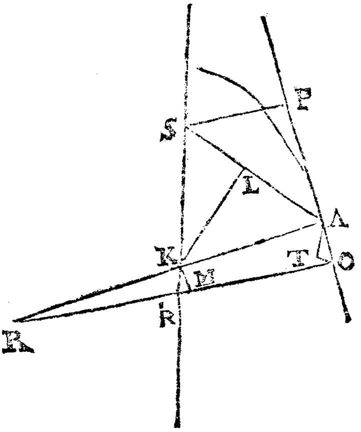
Sit D A B, Ellipſis cujus Axis D B, foci F & S, A R, O R duæ perpendiculares in curvam ſibi proximæ: ducantur KL, O T in S A, & K M in O R perpendiculares. Quia $SA : SK ::$ (a) $FA + SA : FS$, hoc eſt data ratione, erunt rectarum S A, S K Fluxiones A T, K k ipſis S A, SK proportionales; & eſt $AL =$ (b) $\frac{1}{2}$ lateris Recti $= \frac{1}{2} L$. Porro ob K A ad S P parallelam, eſt angulus $ASP = KAL = TOA$ ob ang. T A O utriuſque complementum ad rectum: quare $KA : AL :: SA : SP$, unde $SP = \frac{L}{2} \times \frac{SA}{KA}$ & $KA = \frac{L \times SA}{2\,SP}$. Porro ob æquiangula triang. K M k, G P S & O T A, S P A.

Eſt $KM : Kk :: GP : GS :: AP : SK$.
Item $Kk : AT :: SK : SA$
Item $AT : AO :: AP : SA$

Erit $KM : AO :: AP^2 : SA^2 :: SA^2 - SP^2 : SA^2 :: SA^2 - \frac{L^2 \times SA^2}{4\,AK^2} : SA^2 :: 4\,AK^2 - L^2 : 4\,AK^2$, unde $L^2 : 4\,AK^2 :: (AO - KM : AO ::)\ AK : AR$

(a) *Prop. 3. El. 6ti.* (b) *Prop. 6. partis 4tæ Sect. Con. Milnij.*

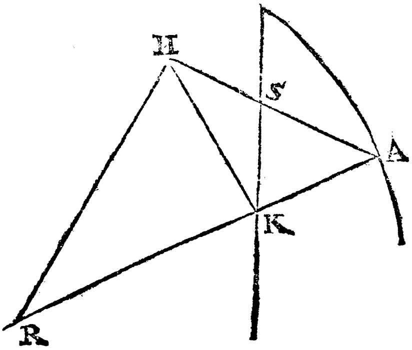
ac proinde $AR = \frac{4AK^3}{L^2}$. Eodem prorſus ratiocinio Invenietur Radius Curvaturæ in Hyperbola æqualis $\frac{4AK^3}{L^2} = \frac{L \times SA^3}{2SP^3}$.



In Parabola vero facilior eſt calculus. Nam ob datam ſubnormalem, eſt Kk ſemper $= AT =$ Fluxioni Axis; & triangula KkM, ATO, SPA, AKL, æquiangula, unde $KM : Kk :: AP$, SA, item eſt AT vel $Kk : AO :: AP : SA$, unde $KM : AO :: AP^2 : SA^2 :: SA^2 - SP^2 : SA^2 ::$ unde erit $SP^2 : SA^2 :: AO - KM : AO :: AK : AR$, ac proinde $AR = \frac{SA^2 \times AK}{SP^2}$; ſed eſt $AL = \frac{1}{2}$ lateris Recti $= \frac{1}{2}L$, & $AK : AL :: SA : SP$, quare erit $\frac{L}{2} \times \frac{SA}{AK} = SP$, & $SP^2 = \frac{L^2 \times SA^2}{4AK^2}$, quare erit $AR = \frac{4AK^3}{L^2}$, vel quoniam eſt, $AK = \frac{L \times SA}{2SP}$, erit $AR = \frac{L \times SA^3}{2SP^3}$.

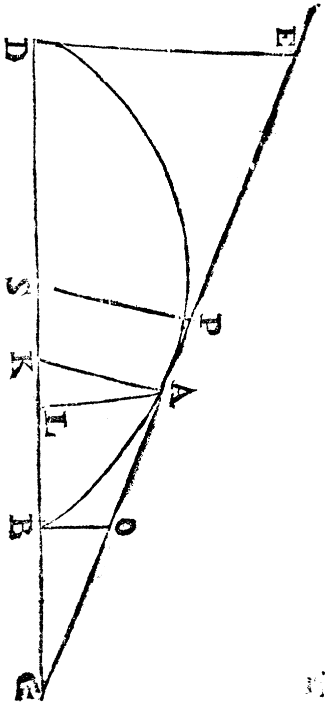
Atque ex his facillima oritur conſtructio, pro determinando Radio curvaturæ in quavis Sectione Conica. Sit enim A K perpendicularis in Sectionem occurrens Axi in K, ex K ſuper A K erigatur perpendicularis H K, cum A S producta concurrens in H. Ex H erigatur ſuper A H, perpendicularis H R, erit A R radius curvaturæ.

In



In Parabola paulo ſimplicior adhuc evadit conſtructio. Nam quoniam ex natura Parabolæ eſt S A = S K, & ang. A K H rectus, erit S centrum circuli per A K H tranſeuntis, unde invenitur Radius curvaturæ producendo S A in H, ut SH=SA, & in H erigendo perpendicularem H R; Et R erit centrum circuli oſculantis Parabolam in A.

Vis Centripeta tendens ad focum Sectionis Conicæ in qua corpus movetur, eſt reciproce proportionalis quadrato diſtantiæ. Nam quoniam $AR = \frac{L \times SA^3}{2SP^3}$ erit $\frac{SA}{SP^3 \times AR}$ $= \frac{SA \times 2SP^3}{SP^3 \times L \times SA^3} = \frac{2}{L \times SA^2}$ hoc eſt ob datam $\frac{2}{L}$ erit vis centripeta ut $\frac{1}{SA^2}$.



Sit Ellipſis BAD quam tangit in A recta G E. Sintque S P per centrum Ellipſis & K A per contactum, tranſeuntes, perpendiculares in tangentem. Erit S P × K A = quartæ parti figuræ Axis ſeu = quadrato ſemiaxis mino-

ris

vis $= BO \times DE$. Nam ob æquiangula triang. GBO, GLA, GAK, GPS & GDE,

$$\begin{array}{lcr} SP : SG & :: & BO : GO \\ SG : DG :: BG : LG & :: & GO : GA \\ DG : DE & :: & GA : AK, \end{array}$$

unde $SP : DE :: BO : AK$; & $SP \times AK = DE \times BO = \frac{1}{2} L \times SB$.

Hinc ſi Mobile moveatur in Ellipſi, vi centripeta tendente ad centrum Ellipſis, erit vis illa directe ut diſtantia; Nam eſt $\frac{SP^3 \times 4 AK^3}{L^2} =$ dati quantitati. Quia eſt $SP \times AK$ quantitas data. Vis igitur, ut $\frac{SA}{SP^3 \times AR}$, erit ut SA diſtantia.

In figura tertia Demiſſa ab altero umbilico F: in Tangentem Perpendiculari FI. Ob æquiangula Triangula SAP, FAI, erit $SA : SP :: FA : FI = \frac{SP \times FA}{SA}$, unde erit $SP \times FI = \frac{SP^2 \times FA}{SA} =$ quadrato ſemiaxis minoris: unde ſi Axis major vocetur b, minor autem $2d$, erit $SP^2 = \frac{d^2 SA}{b - SA}$ & $SP = \frac{d . SA^{\frac{1}{2}}}{\sqrt{b - SA}}$.

In Hyperbola autem eſt $SP = \frac{d SA^{\frac{1}{2}}}{\sqrt{b + SA}}$.

In Parabola eſt $SP = \sqrt{d SA}$, poſito ejus latere recto $= 4 d$.

Quoniam eſt $TA^2 : TO^2 :: AP^2 : SP^2 :: SA^2 - SP^2 : SP^2 :: SA^2 - \frac{d^2 SA}{b - SA} : \frac{d^2 SA}{b - SA} :: SA - \frac{d^2}{b - SA} \frac{d^2}{b - SA} :: b SA - SA^2 - d^2 : d^2$, erit $\sqrt{b SA - SA^2 - d_2}$

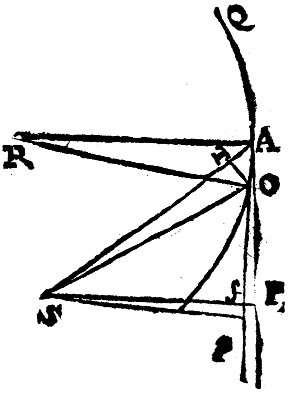
$: d$

$: d :: TA : TO$ cumque ſit $TA = S\dot{A}$, erit $TO = \frac{dS\dot{A}}{\sqrt{bSA - SA^2 - d^2}}$.

Sit jam Q A O. Quælibet curva, cujus arcus minimus ſit A O, tangentes in punctis A & O, A P, O p. Radius Curvaturæ A R, Perpendiculares in tangentes ſint S P, S p, erit $\frac{SA \times TA}{fP} = AR$. Nam ob equiangula triangula eſt

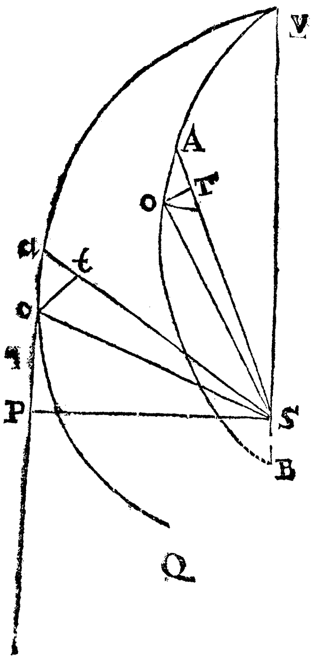
$fP : AO :: PA : RA$
$\& \; AO : TA :: SA : PA$;

unde ex æquo erit $fP : TA$ vel $S\dot{A} :: SA : RA$, eſt vero $fP = S\dot{P}$, quare erit $RA = \frac{SA \times S\dot{A}}{S\dot{P}}$.



Hinc ſi diſtantia S A, in ſuam Fluxionem ducatur, & dividatur per Fluxionem perpendicularis, habebitur radius Curvaturæ; Quo Theoremate facile determinatur Curvatura in Radialibus curvis. Exempli Gratia. Sit A Q, Spiralis Nautica; quoniam angulus S A P datur, ratio quoque S A ad S P dabitur; ſit illa ratio a ad b, erit $SP = \frac{bSA}{a}$ & $S\dot{P} = \frac{bS\dot{A}}{a}$ & $AR = \frac{SAS\dot{A}}{S\dot{P}} = \frac{aSA}{b}$, unde facile conſtabit, Spiralis Nauticæ Evolutam eſſe eandem Spiralem, in alia poſitione.

Quoniam $AR = \frac{SAS\dot{A}}{S\dot{P}}$, erit $\frac{SA}{SP^3 \times AR} = \frac{S\dot{P}}{SP^3 \times S\dot{A}}$ Atque hinc rurſus, ex data relatione S A ad S P, facile invenietur lex vis centripetæ.



Exemplum. Sit V A B Ellipſis cujus focus S, Axis major V B = b, Axis minor = 2 d, latus Rectum = 2 R. Sitque V a Q alia curva, ita ad hanc relata, ut ſit perpetuo angulus V S A angulo V S a proportionalis, & ſit S a = S A. Quæritur lex vis centripetæ tendentis ad S, qua corpus in curva V a Q moveri poteſt.

Quoniam ang. V S A eſt ad V S a, in data ratione; horum angulorum incrementa erunt in eadem ratione, ſitque ea ratio m ad n; unde erit $ot = \frac{n \times OT}{m}$.

Eſt autem $OT = \frac{dS\dot{A}}{\sqrt{bSA - SA^2 - d^2}}$

unde erit $ot = \frac{ndS\dot{A}}{m\sqrt{bSA - SA^2 - d^2}}$.

Quoniam autem eſt $SA^2 + SP^2 : SP^2 :: ta^2 + ot^2 : ot^2$

$$:: S\dot{A}^2 + \frac{n^2 d^2 S\dot{A}^2}{m^2 \, \overline{bSA - SA^2 - d^2}} : \frac{n^2 d^2 S^2}{m^2 \, \overline{bSA - SA^2 - d^2}}$$

$$:: 1 + \frac{n^2 d^2}{m^2 \times \overline{bSA - SA - d^2}} : \frac{n^2 d^2}{m^2 \times \overline{bSA - SA^2 - d^2}} ::$$

$m^2 bSA - m^2 SA^2 - m^2 d^2 + n^2 d^2 : n^2 d^2$, unde erit $\sqrt{m^2 bSA - m^2 SA^2 - m^2 d^2 + n^2 d^2} : nd :: SA : SP$, & $SP = \frac{ndSA}{\sqrt{m^2 bSA - m^2 SA^2 - m^2 d^2 + n^2 d^2}}$.

Cujus ut habeatur fluxio pro $m^2 bSA - m^2 SA^2 -$

m^2

$\overline{m^2d^2 + n^2d^2}$. Seribatur x & erit $SP = \frac{nd\,SA}{\sqrt{x}}$, & $SP^3 = \frac{n^3d^3\,SA^3}{x^{\frac{3}{2}}}$; & eſt $\dot{x} = m^2b\,S\dot{A} - 2m^2\,SA\,S\dot{A}$, & $S\dot{P} = nd\,S\dot{A} \times x^{-\frac{1}{2}} - \frac{1}{2}\frac{nA\,SA\,\dot{x}}{x^{\frac{3}{2}}}$, & reducendo partes ad eundem denominatotem; erit $S\dot{P} = \frac{nd\,S\dot{A}\,x - \frac{1}{2}nd\,SA\,\dot{x}}{x^{\frac{2}{2}}}$. Et in numeratore loco, x & $\dot{x}$, ponendo ipſorum valores, & ordinando fit $SP = \frac{nd\,SA \times \overline{\frac{1}{2}m^2b\,SA - m^2d^2 + n^2d^2}}{x^{\frac{3}{2}}}$, unde erit $\frac{S\dot{P}}{SP^3 \times S\dot{A}} = \frac{\frac{1}{2}m^2b\,SA - m^2d^2 + n^2d^2}{n^2d^2\,SA^3}$. Sed eſt $\frac{S\dot{P}}{SP^3 \times S\dot{A}}$, ut vis centripeta, quare erit vis, ut $\frac{{}^{2}m^2b\,SA - m^2d^2 + n^2d^2}{n^2d^2\,SA^3}$ vel ob datam n^2d^2 in denominatore erit vis, ut $\frac{\frac{1}{2}m^2b\,SA - m^2d^2 + n^2d^2}{SA^3}$, vel loco d^2 ponendo $\frac{bR}{2}$, erit vis ut $\frac{\frac{1}{2}m^2b\,SA - \frac{1}{2}m^2bR + \frac{1}{2}n^2bR}{SA^3}$, ſeu ob datam $\frac{b}{2}$, ut $\frac{m^2\,SA - Rm^2 + Rn^2}{SA^3} = \frac{m^2}{SA^2} + \frac{Rn^2 - Rm^2}{SA^3}$. Quæ omnia exacte coincidunt, cum iis quæ à Domino Newtono de vi centripeta corporis in eadem curva moti, traduntur, in *Prop.* 44. *Princip.*

Quoniam vis Centripeta tendens ad punctum S, qua urgente corpus in curva moveri poteſt, eſt ſemper ut $\frac{S\dot{P}}{SP^3 \times S\dot{A}}$; hinc ex data lege vis Centripetæ, Inveniri poteſt relatio S A ad S P, ac proinde per methodum Tangentium Inverſam, exhiberi poteſt Curva quæ data vi Centripeta deſcribi poſſit.

Sit verbi gratia Vis reciproce ut diſtantiæ Dignitas quælibet m, hoc eſt, ſit $\frac{S\dot{P}}{SP^3 \times S\dot{A}} = \frac{b}{a^2 SA^m}$, erit $\frac{S\dot{P}}{SP^3} = \frac{b\,S\dot{A}}{a^2 SA^m}$, & capiendo harum fluxionum fluentes; erit $\frac{1}{2}SP^{-2} = \frac{b\,SA^{1-m} \mp e}{\overline{m-1} \times a^2}$, unde erit $\frac{\frac{m-1}{2} \times a^2}{b\,SA^{1-m} \mp e} = SP^2$, & multiplicando tam numeratorem, quam denominatorem fractionis, per SA^{m-1}; & loco $\frac{m-1}{2}a^2$ ponendo d^2, fit $\frac{d^2 SA^{m-1}}{b \mp e\,SA^{m-1}} = SP^2$; quare erit $SP = \frac{d\sqrt{SA^{m-1}}}{\sqrt{b + e\,SA^{m-1}}}$.

Quod ſi quantitas conſtans e ſit nihilo æqualis erit $SP \frac{\sqrt{SA^{m-1}}}{\sqrt{b}}$.

Adeoque ſi vis reciproce ut diſtantiæ quadratum, poni poteſt $SP = \frac{\sqrt{d^2\,SA}}{\sqrt{b}}$, & curva erit parabola cujus latus rectum eſt $\frac{4d^2}{b}$, vel poteſt eſſe $SP = d \times \frac{\sqrt{SA}}{\sqrt{b - SA}}$, & curva erit Ellipſis vel denique poteſt eſſe $SP = d \times \frac{\sqrt{SA}}{\sqrt{b \times SA}}$, & curva evadit Hyperbola.

Si vis ſit reciproce ut diſtantiæ cubus ſupponi poteſt, ut S P ſit $= \frac{dSA}{b}$, & curva ſit ſpiralis Nautica, vel fieri poteſt ut ſit S P $= \frac{dSA}{\sqrt{b - eSA^2}}$, & Curva erit eadem cum eâ cujus conſtructionem à ſectore hyperbolæ petit Dominus Newtonus; vel poteſt eſſe S. P $= \frac{dSA}{\sqrt{b + eSA^2}}$, & ejus Curvæ conſtructionem per Sectores Ellipticos tradit idem Newtonus, *Cor.* 3. *Prop.* 1. *lib.* 1. *Princip*

Si vis centripeta ſit reciproce ut diſtantia; relatio inter S A & S P, æquatione Algebraica definiri nequit, Curva tamen per Logarithmicam vel per quadraturam Hyperbolæ conſtruitur, ſit enim S P $= \frac{d}{\sqrt{b - L.SA}}$, ubi L. S A deſignat Logarithmum ipſius S A.

Hæc omnia ſequuntur ex celebratiſſimâ nunc dierum Fluxionum Arithmeticâ, quam ſine omni dubio Primus Invenit Dominus Newtonus, ut cui libet ejus Epiſtolas à Walliſio editas legenti, facile conſtabit, eadem tamen Arithmetica poſtea mutatis nomine & notationis modo; à Domino Leibnitio in Actis Eruditorum edita eſt.

Moveatur jam corpus in Curva Q A O, vide *fig.* 1. urgente vi centripeta tendente ad S; & Celeritas corporis in A dicatur C; celeritas autem qua corpus urgente eadem vi centripeta, in eadem diſtantia, in circulo moveri poteſt, dicatur *c*. Conſtat ex Theoremate primo, quod ſi S A exponat vim Centripetam tendentem ad S; vis Centripeta tendens ad R, qua urgente, corpus cum celeritate C, circulum cujus radius eſt A R deſcribet; per S P exponetur. Corporum autem circulos deſcribentium, vires Centripetæ ſunt ut velocitatum quadrata ad circulorum radios applicata, quare erit S P : S A : :

$\frac{C^2}{AR} : \frac{c^2}{SA}$, unde erit $SP \times AR : SA^2 :: C_2 : c^2$ & $C : c ::$ $\sqrt{SP \times AR} : SA$.

Si SP cum SA coincidat, ut fit in figurarum verticibus erit $C : c :: \sqrt{AR} : \sqrt{SA}$. Quod ſi curva ſit Sectio Conica AR, radius curvaturæ in ejus vertice eſt æqualis dimidio lateris recti $= \frac{1}{2} L$, ac proinde erit velocitas corporis in vertice Sectionis, ad velocitatem corporis in eadem diſtantia circulum deſcribentis, in dimidiata ratione lateris recti, ad diſtantiam illam duplicatam.

Quoniam eſt $AR = \frac{SA \times S\dot{A}}{S\dot{P}}$, erit $C^2 : c^2 ::$ $\frac{SP \times SA \times S\dot{A}}{S\dot{P}} : SA^2 :: \frac{SP \times S\dot{A}}{S\dot{P}} : SA :: SP \times S\dot{A}$ $: SA \times S\dot{P}$, adeoque ex data relatione SP ad SA, dabitur ratio C ad c, Exempli Gratia. Si vis ſit reciproce ut diſtantiæ dignatas m, hoc eſt ſit $\frac{S\dot{P}}{SP^3 \times S\dot{A}} = \frac{b}{a^2 SA^m}$; & erit $S\dot{P} = \frac{b SP^3 \times S\dot{A}}{a^2 SA^m}$, adeoque erit $C^2 : c^2 ::$ $SP \times S\dot{A} : \frac{b SP^3 \times SA \times S\dot{A}}{a^2 SA^m} :: a_2 SA^{m-1} : b SP^2$. Unde ſi ponatur $SP^2 = \frac{d^2 SA^{m-1}}{b} = \frac{m-1}{2} \frac{a^2 SA^{m-1}}{b}$, erit $C^2 : c^2 :: a^2 SA^{m-1} : \frac{m-1}{2} a^2 SA^{m-1} :: m-1 : 2$ ac proinde erit $C : c :: \sqrt{2} : \sqrt{m-1}$.

Quod ſi ponatur $SP^2 = \frac{d^2 SA^{m-1}}{b - e SA^{m-1}} = \frac{m-1}{2} \frac{a^2 SA^{m-1}}{b - e SA^{m-1}}$ fiet C^2 ad c^2, ut $a^2 SA^{m-1}$ ad $\frac{\frac{m-1}{2} a^2 b SA^{m-1}}{b - e SA^{m-1}}$, hoc eſt ut $b - eSA^{m-1}$ ad $\frac{m-1}{2}b$, ſed eſt ratio $b - eSA^{m-1}$, ad $\frac{m-1}{2} \times b$, minor ratione b ad $\frac{m-1}{2}b$, ſeu ratione 2 ad $m - 1$, unde erit C ad c in minore ratione quam eſt $\sqrt{2}$ ad $\sqrt{m-1}$.

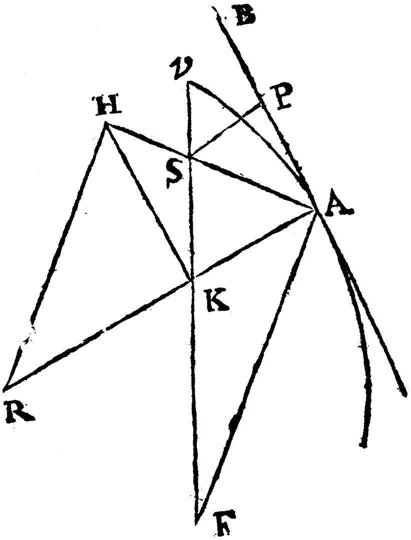
Similiter, ſi capiatur $SP = \frac{d_2 SA^{m-1}}{b + eSA^{m-1}}$, invenietur eſſe C ad c in majore ratione quam eſt $\sqrt{2}$ ad $\sqrt{m-1}$.

Cor. Si corpus in Parabola moveatur, & vis Centripeta tendat ad focum S, erit velocitas corporis, ad velocitatem corporis in eâdem diſtantiâ, circulum deſcribentis ubique ut $\sqrt{2}$ ad 1, nam in eo caſu eſt $m = 2$ & $m - 1 = 1$. Velocitas corporis in Ellipſi eſt ad velocitatem corporis, in circulo ad eandem diſtantiam moti, in minore ratione quam $\sqrt{2}$ ad 1. Velocitas in Hyperbola eſt ad velocitatem in crculo in majore ratione, quam $\sqrt{2}$ ad 1.

Si Corpus in Spirali Nautica deferatur, eſt ejus velocitas ubique æqualis velocitati corporis in eadem diſtantia circulum deſcribentis nam in eo caſu eſt $m = 3$ & $m - 1 = 2$.

PROBLEMA.

Poſito quod vis Centripeta (cujus quantitas abſoluta nota eſt,) ſit reciproce ut diſtantiæ quadratum & projiciatur corpus ſecundam datam rectam cum data velocitate. Invenire curvam in qua movetur corpus.



Projiciatur Corpus ſecundum datam rectam A B, cum data velocitate C. Et quoniam quantitas abſoluta vis centripætæ nota eſt, dabitur inde velocitas qua corpus poſſit circulum ad diſtantiam S A deſcribere urgente eadem vi; eſt enim æqualis ei quæ acquiritur, dum corpus vi illâ uniformiter applicata urgente, cadit per $\frac{1}{2}$ S A. Sit illa velocitas c. Ex A in A B, erigatur perpendicularis A K, & in ea Capiatur A R, quarta proportionalis ipſis c^2 C^2 & $\frac{SA^2}{SP}$ & erit A R, radius curvaturæ in A. Ex R in A S demittatur perpendicularis R H & ex H in A R perpendicularis H K, & ducta recta S K, dabit axis poſitionem; Fiat angulus F A K = angulo S A K. Et ſi F A ſit ad S K Parallela figura in qua movetur corpus erit Parabola. Si autem Axi S K occurrat in F; & puncta S & F, cadant ad eandem partem puncti K, figura erit Hyperbola; ſin ad contrarias partes cadant puncta S & F, erit figura Ellipſis, unde focis S & F & Axe = S A + F A deſcribetur ſectio, in qua corpus movebitur.

III. *An*